 national accelerator laboratory	Author G. S. Tool	Section R.F.	Page 1 of 6
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Subject

RF Control Computer Configuration

This note describes the computer configuration required for the RF section control computer. The configuration hereing described is the result of discussions held at NAL with representatives of NAL Directors Office, Booster, Linac and RF Sections and Scientific Data Systems, Inc., concerning a combined Linac, Booster, RF control computer system. The primary purpose of such a combined system is to provide the needed facilities at the lowest overa11 cost by having several control computers share a common set of computational peripheral equipment necessary for efficient control system development. A secondary benefit will be the experience derived from having several systems tied together in a manner very much like that anticipated in the 200 BeV Accelerator.

The RF control computer configuration shown in Figure 1 is based upon the present Linac computer being expanded to the configuration shown in Figure 2. The RF configuration has been reduced to the minimum that will allow stand-alone operation in the event that the Linac computer is inoperative. The peripheral equipments attached to the Linac computer are for the common use of all the processors in the system. Operation of the Linac computer is required for the other computers to access the peripherals. High-speed paper tape I/O is thus necessary at each of the smaller installations to allow program input-output when the Linac processor is down.

A detailed list of the items and features required initially and their estimated prices is shown below:

<u>Item</u>	<u>Qty.</u>	<u>Model</u>	<u>Description</u>	<u>Price</u>
1	1	8001	Sigma 2 CPU	12,000
2	1	8011	Two Real-Time Clocks	2,000
3	1	8012	Memory Parity Interrupt	500
4	1	8013	Power Fail Safe	1,000
5	1	8014	Protection Feature	2,000
6	1	8020	Multiply/Divide	6,000
7	1	8021	Interrupt Control Chassis	2,200
8	3	8022	Priority Interrupt, 2 levels	1,050
9	1	8051	Memory: 4096 Words	12,000
10	1	8053	Memory Increment: 4096 Words	10,000
11	1	8070	External Interface	1,500
12	1	8072	Watchdog Timer	3,500
13	1	8091	Keyboard/Printer, KSR-35	5,000
14	1	7060	Paper Tape Reader, Punch, Spooler, with Controller and Rack	12,000
15	1	7929	IOP to DIO Adapter	5,500
TOTAL:				76,250
Expected Discount:				4,725
NET TOTAL:				71,525

The above costs are the GSA prices of the equipment and do not reflect any special package discount such as that contained in SDS proposal No. 09980102. The special package discount price of the above configuration would be \$63,725.

Additional equipment needed in the second phase of procurement is a CRT/Keyboard Terminal and analog-digital interface equipment. An SDS CRT terminal is available and could be included in the initial configuration, but there is currently a great deal of activity in the computer industry toward developing low-cost, versatile CRT terminals. Further study of the available options is desirable before purchasing such a terminal.

Specification of the analog-digital interface equipment requires a considerable amount of additional study. In fact, as the development of the rf system hardware progresses, these requirements will take shape as the equipment design proceeds. The primary requirements can be determined during the delivery time of the initial computer equipment order. The set-up period for central processor operation can occur during the relatively short delivery time of standard interface equipment.

As stated previously, satisfactory operation with the configuration shown in Figure 1 depends upon a total system including direct connection to the Linac computer shown in Figure 2. In particular, rf system development programs depend upon the Linac computer being outfitted with the following computational peripherals:

- 1 - Magnetic tape unit w/controller
- 1 - 3 Megabyte disc memory
- 1 - 600 lpm line printer
- 1 - 400 cpm card reader

If the RF computer were to exist by itself outside the proposed combined system, the following items would have to be added to the configuration:

<u>Qty.</u>	<u>Model</u>	<u>Description</u>	<u>Price</u>
2	8053	Memory Increment	\$ 20,000
1	7122	Card Reader, 400 cpm	16,000
1	7201	RAD Controller	8,000
1	7202	RAD Storage, 0.75 mb	18,000
1	7361	20kc Mag Tape Ctl.	6,000
1	7362	20kc Mag Tape Unit	19,000
1	7365	BCD Option	2,000
1	7440	Line Printer, 600 lpm	35,000
TOTAL:			\$124,000
EXPECTED DISCOUNT:			12,400
NET TOTAL:			\$111,600

In this configuration, one each of ~~items~~ 7, 8, 14, and 15 listed on page 2 would not be needed. This results in a reduction of \$18,045. Hence, an isolated RF computer configuration would total $\$71,525 + \$111,600 - \$18,045 = \$165,080$, or \$93,555 more than the proposed system, a part of which would have been acquired on next year's budget.

Maintenance

The RF Section strongly recommends that a maintenance contract be purchased from the vendor along with the equipment. It is desirable to have NAL personnel become familiar with the hardware, but the maintenance of the computer and peripheral equipment is much more efficiently performed by the vendor's service personnel who repair other similar systems on a daily basis.

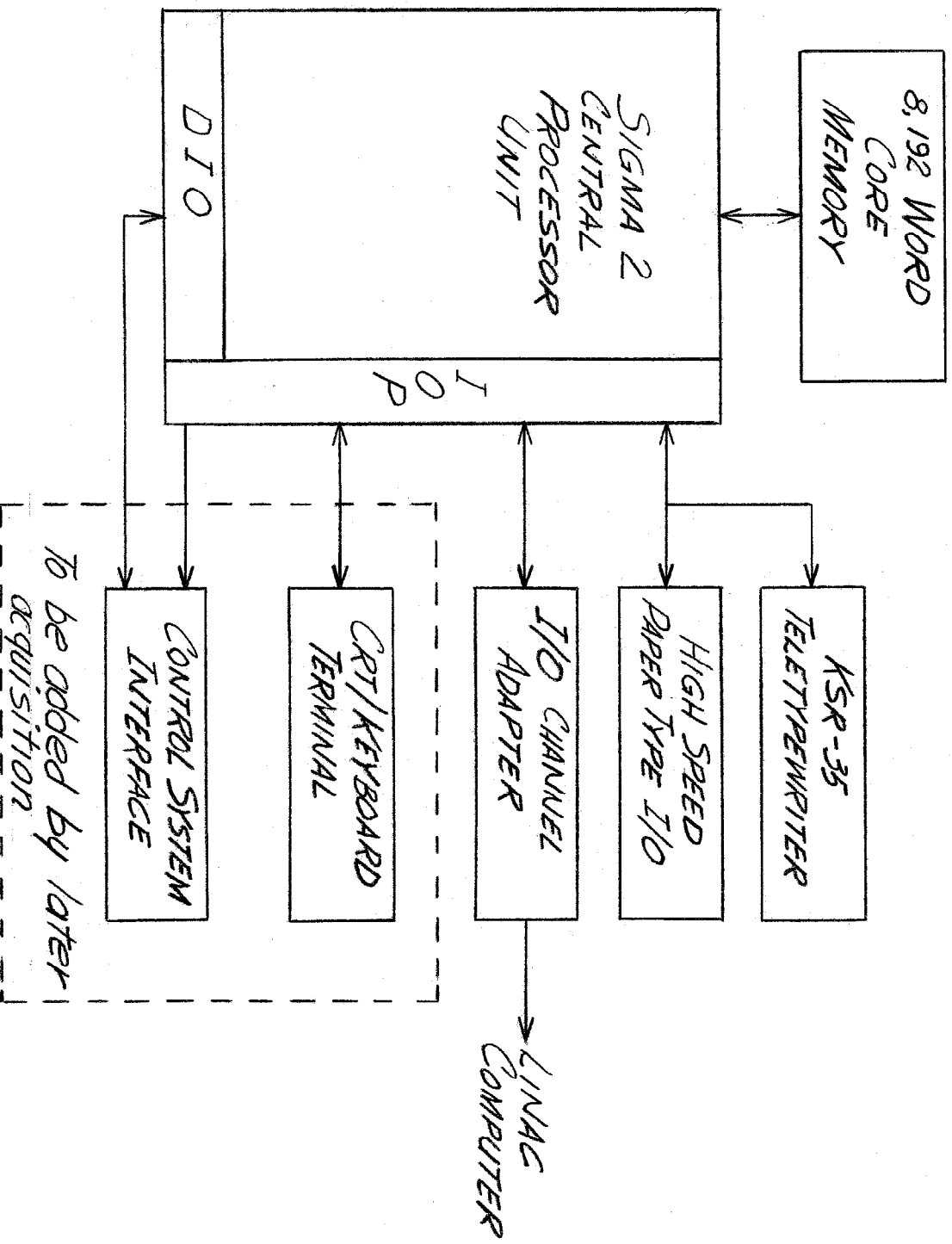


FIGURE 1: RF CONTROL COMPUTER CONFIGURATION

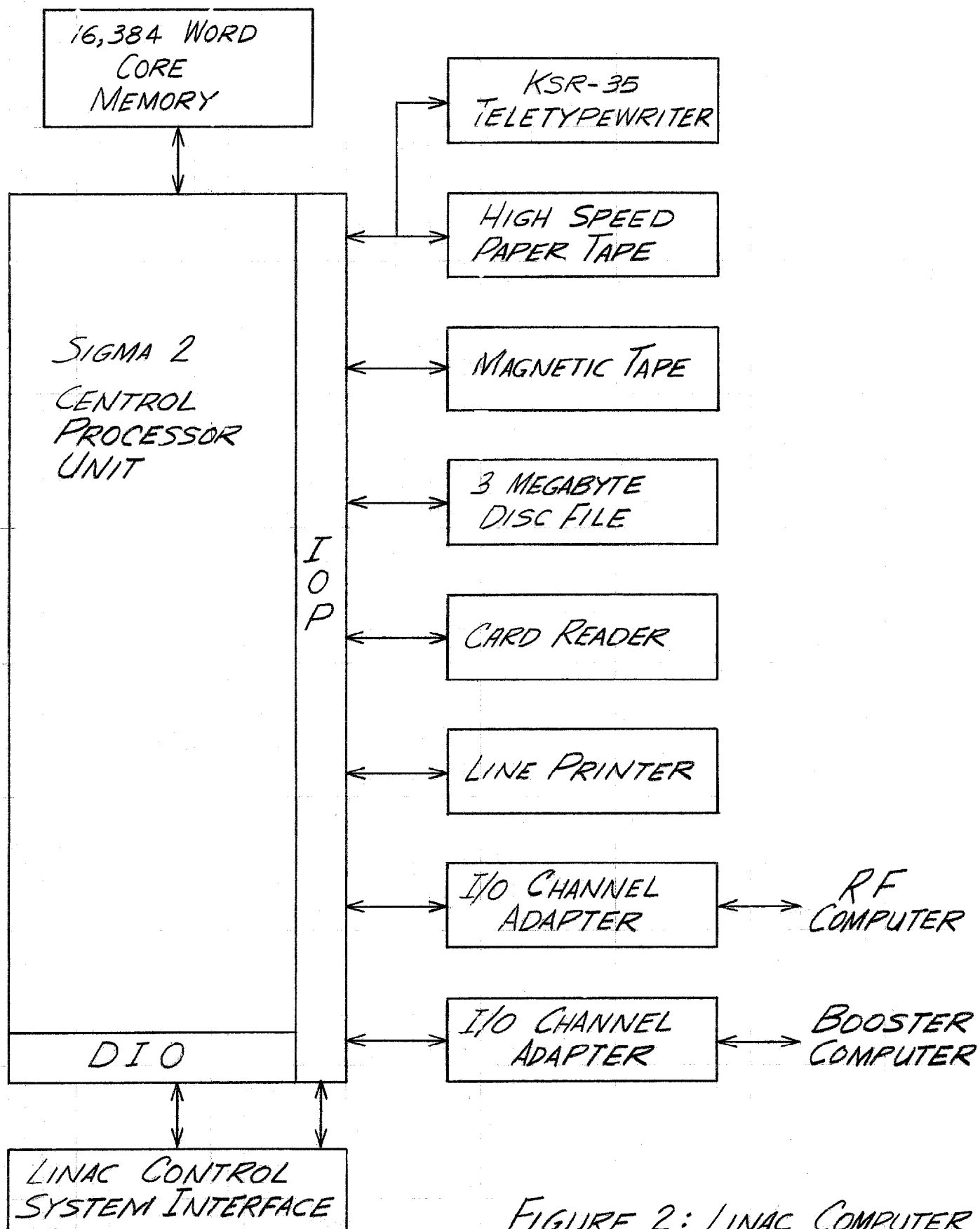


FIGURE 2: LINAC COMPUTER CONFIGURATION